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ABSTRACT

Practical methods that may help the training officer in factories in the selection and training of operators are presented. Subjects discussed in this guide are: Selection; Where to Train; Skills Analysis Training; Training Manuals; Instructors; Records; Induction; Training of Special Groups; and Retraining. (DB)

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Training the Operator
A Practical Guide

E M Gentles

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INSTITUTE OF PERSONNEL MANAGEMENT

THE INSTITUTE OF PERSONNEL MANAGEMENT

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Training the Operator
A Practical Guide

by

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formerly of South Birmingham Technical College

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This publication is the first in a new IPM series of practical handbooks on personnel management subjects. *Training the Operator—A Practical Guide* is intended to provide an introduction to the subject of operator training for recently appointed personnel and training officers; it should also prove useful to line managers, supervisors and instructors on the factory floor.

TRAINING THE OPERATOR—A PRACTICAL GUIDE

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Acknowledgements

While every effort has been made in this booklet to avoid reflecting the policies and practices of one firm, I would like to acknowledge my debt to Joseph Lucas Ltd as much of this material is based upon my work in operator training with this company. I have also drawn on my experiences with the National Institute of Industrial Psychology to which I was seconded for a time to assist with a survey of industrial in-plant training programmes in seven European countries.

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1 Introduction

It is now widely recognized that the selection and training of operators has an important bearing on the productivity of a factory. Indeed, so much advice is now being given by various bodies from public platforms on the subject of operator training that the average training officer may find it difficult to determine the best approach to the problems confronting him in his organization. The aim of this publication is to describe some practical methods which may help him to overcome some of his difficulties.

Whatever decision is taken on the approach to operator training, the chief need in most factories is now and always has been to instruct unskilled men and women to acquire good working habits in as short a time as possible, to be capable of using tools and equipment efficiently up to the speed of the experienced worker and to do a variety of related jobs.

The results of training

But why should we train? What are the results? By careful analysis and the use of planned training programmes of constant instruction and supervision, learning periods can be reduced considerably and high levels of performance reached more quickly. It has been proved that learning periods for jobs traditionally taking 12 weeks to learn can be reduced to four. Other clear results are improved quality, reduction in accidents and improved morale. Reduced labour turnover can often be claimed, too, although where large numbers of women are employed this can be difficult to determine as the turnover may be high because so many leave for domestic reasons. There is no doubt that constructive training makes for easier recruitment, particularly of older men and women, many of whom would not have the self-confidence to work in factories at all after years at home if training were not available. It is possible to make an estimate of the cost of the instruction by calculating the wages of instructors and trainees plus the overheads of a training department and by deducting the value of production work done in the training centre. It is not so easy to make an accurate estimate of what it costs *not* to train, eg in terms of lost production, scrap, failure to qualify for training allowances and grants etc, but if one is prepared to spend the time, fairly accurate and rather startling figures can be produced to prove that training really does pay.

2 Selection

The problems of operator training start with selection. Too often this fact is ignored completely or the implications are not fully understood. Where understanding exists, there is still a general assumption that little can be done, particularly in those regions where there are too many vacancies and too few operators to fill them, although even here it is worth using the techniques of a full interview and tests to make the most of the abilities of the few applicants available; this also helps to avoid the high labour turnover which usually follows when no attempt is made to sift the qualities of the applicants. It is not uncommon to hear of cases in areas of full employment where a company's staff intake at the beginning of the week tallies with the number leaving. There is also a tendency to think that all new semi-skilled operators have the same level of ability, when in fact the cross-section of the community which forms the corps of factory operators varies widely in background and range of ability from the almost illiterate to the highly intelligent. This applies particularly with women operators, many of whom for various reasons, such as family background and early marriage, have slipped through the educational net and are doomed to carry out routine jobs well below their capabilities. It is to the credit of some managers that they have recognized this and have quietly promoted such women to key jobs. These women have often had no formal training for their new responsibilities and no formal recognition of their status.

Much attention is focused on the importance of the interview in selecting personnel and many courses in interviewing are run in colleges and elsewhere. But it appears that, for the semi-skilled operator, the interview is still sketchily conducted by a harassed personnel officer caught up in the vicious circle of selecting in too short a time applicants who often do not remain with the firm; they leave because they have not been placed according to their abilities and are well aware that they can always try the factory further up the road. The seasonal nature of many industries complicates the problem because long periods when employment is at a standstill are followed by relatively short periods when great haste is made to engage large numbers quickly; with the best will in the world standards fall. It is surprising, too, how often firms give the recruiting work to the young inexperienced man or woman who lacks both knowledge of how to match the person to the job and skill in interviewing.

There is therefore no short cut to building up a case history of an applicant; this must be done by a full interview and with the aid of tests—a process which many find time consuming as there are so many points which must be noted. Surprisingly, it is frequently the unobtrusive points that make an applicant unsuitable for a particular job, points which the interviewer has failed to pick up because of lack of time or skill. This is illustrated by the example of a girl who had two small growths on each thumb which prevented her from picking up

small components on assembly. These were not noticeable during the interview as the girl had trained herself from schooldays to conceal her hands out of embarrassment, but the growths were revealed when she performed a simple manual dexterity test.

It is surprising, too, how often interviewers ignore the physical attributes of the person in relation to the job which he or she will perform. Thus we find the man who is too tall having to bend in order to see through a glass panel what is happening to his machine or the man who is too small having to stretch. There is in fact a tendency to underestimate the amount of physical fatigue caused by the average semi-skilled job.

Tests, both of intelligence and manual dexterity, provide a short cut to information about an applicant but again are surprisingly rarely used in the selection process for semi-skilled operators, although used increasingly in the selection of apprentices. The temptation not to use tests in an area where there is a shortage of labour is understandable as it can be a lengthy process but this is just the situation where tests are important in order to make the best use of the applicant's abilities. Tests should never be used without the interview but the information derived from the one often supplements the other. Both are necessary; for example, a test may show that an applicant is likely to make a good capstan operator while the interview reveals that there is a medical reason why he or she is unable to stand at a machine for eight hours a day. Again the interviewer may know from a dexterity test that an operator is suitable for fine work but may form an impression from the interview that he or she has not the patience for such work. Where there is a shortage of employment it may be better to use the interview for engagement and to use tests for placing rather than for initial selection. In this way it may be possible to place the man or woman who is not suitable for a fast piecework line in other indirect work in the factory, such as restaurant, cleaning or labouring jobs, thereby filling vacancies which are often more difficult to fill than direct production jobs.

Unless the personnel or training manager has considerable experience and is thoroughly aware of what he is doing, he should avoid experiments in devising tests. Personnel managers who have engaged a young psychologist straight from university and plunged into setting up batteries of tests have been disappointed and disillusioned to find so little correlation between performance on test and on the actual job. It is much better to go to an expert body like the National Institute of Industrial Psychology, which rightly insists on proper training for the person who is going to administer the tests and a copyright of the tests themselves.

There are also tests which can be bought on the open market and which, if used sensibly, can be of great help. Raven's Matrices non-verbal intelligence test is one that can be recommended and has been found particularly useful for entrants who have a language problem or disability, eg of speech or hearing. It is always preferable to use a combination of intelligence and manual dexterity tests but the use of a simple written intelligence test on its own can indicate clearly whether the trainee will be able to cope with an intricate job or must have very simple work.

If there seems to be no justification for a battery of tests and if there is likely to be a dearth of trained staff to administer them, at least the use of a test of vision should be considered. So often an employee cannot perform a task at piecework speed not because of lack of intelligence or finger dexterity but because of a visual defect. A simple test like the Stereosette Eye Test, which can be given by a trained secretary, may provide valuable information by indicating what work the operator will be unable to do because of a visual fault. Furthermore—and this applies to all tests—additional information may sometimes come to the surface while the test is in progress. In one case, for example, it was established from the use of the Stereosette Test that a man was not only blind in one eye but also illiterate; the use of written instructions about his job in the form of charts were thus meaningless to him.

Some will argue that tests are negative in that they explain what not to do rather than what should be done in selection; that they take no account of motivation and that the best they can do is to prevent the employment of the ham-handed operator on intricate work. This may be so but used in conjunction with the information culled at the interview, they will provide a much fuller picture of the likely capabilities of the new employee and a better starting point for training. Furthermore, they provide this information in a much shorter time than if it is left to emerge gradually during the first few months of employment.

3 Where to train

The problem of whether training should be carried out in a section away from the plant or whether it should take place on the shop floor is always difficult for management to decide; what may suit one type of production may not suit another. Above all it is important that training be tailor-made to suit the demands of the particular factory. There is, however, a good case for carrying out some initial training away from the noise and bustle of production and then following it up closely with training on the shop floor.

The separate training unit

If it is decided to have a separate training section there are three main problems involved:

(i) It is important that the plant in the training section should resemble as closely as possible that in the factory. Nothing is to be gained by training new people on old machines which are likely to break down frequently, particularly if they bear little or no resemblance to the modern plant which the trainees will finally operate on piecework. It merely lengthens the time it takes for the man or woman to become a skilled operator.

(ii) The equipment must be representative of the needs of the factory. This can present a problem as there may be a strong case for duplicating all the plant required for training purposes. But this would be considered uneconomic, and in most cases training can be given only on the plant which is most commonly used in the factory. On the other hand, it may be vitally necessary to duplicate the machine and equipment where the persistent bottle-necks occur, eg where the turnover is particularly high or where it takes a long period to attain piecework earnings. Furthermore, few training sections have the necessary flexibility to put away and bring out plant as it is required—a flexibility which is becoming increasingly essential because of the rate of technological change.

(iii) One of the chief problems of a training section is keeping up to date with the needs of the factory which is changing and expanding. It is important that budget requirements are made on an annual basis and that the training department has its share of new plant and equipment. It is equally essential that, as new jobs and techniques develop, the training department should be put in the picture in time to make the necessary training plans. So often it is approached only when the learning problem has become urgent and valuable time is lost, for example, in the training of instructors. A training department that has become static is out of date, engaged in training operators on one method of production when a newer one has superseded it.

It is also essential that the work done in the training centre should resemble as closely as possible that done in the factory. In particular, the amount of

work done can give rise to a number of difficulties. Once the training officer has taken over certain production work from the factory supervision he must try to have it completed in the time promised or supervisors will lose faith and refuse to let jobs go to the training department. He must therefore estimate fairly accurately how much he can achieve, bearing in mind that his operators will range from the raw recruit to the person who is almost achieving piecework standard. One good basis for measurement is to accept a work load at half the speed of experienced workers; this allows for the new trainee who is producing little and for the trainee nearly at the end of the course who may be attaining the speed of the experienced operator.

The time lag in the factory presents another problem for the training officer. To anticipate rising production, a number of new people are recruited at a faster rate than the work expands and in this situation an emergency supply of work which can be done over and over again, together with exercises, may be the only answer.

If trainees are instructed in a training area away from the shop floor, the introduction to the factory may have to be handled carefully. The shock of going from the small compact training unit to the actual work place where the trainee may not receive individual attention can be frightening. A follow-up instructor from the training department can do much to help the newcomer over the problems of settling down which are often not connected with ability to perform a task at a certain speed but with the difficulties of fitting into a group. On the other hand, critics of the separate training department can over-emphasize the effect of change from training department to works, referring to the dangers of a 'heaven-hell' atmosphere. But it should be remembered that, apart from school leavers, many new employees will have worked in factories before and will not therefore be so surprised at the change. In any case the time spent in the training department is likely to be short compared with that spent in the factory and is therefore unlikely to make a big impact.

The shop floor

Those who emphasize the problems of training in a separate area tend to forget that the problems of instructing on the floor of the shop are equally great even when carried out by a trained instructor. Ensuring the release of production plant for long enough to provide the satisfactory training is one difficulty; failure to do this is the cause of much inadequate instruction. Another and perhaps greater difficulty is that of training on a moving conveyor, the speed of which is often frightening to a new employee. Sometimes, too, there is not enough room on a conveyor line for an instructor to instruct and the new employee may miss the full impact of what is being said or demonstrated because of the hustle and bustle around him. Another problem concerns the instructor himself who may be responsible to a training officer but must work within the authority of the chargehand—a situation which calls for the skills of a diplomat as well as those of an instructor. At the same time, most chargehands or junior supervisors on their own admission devote less time to new

employees than is generally assumed, mainly because of pressure of other duties but sometimes through lack of inclination. Most factories need 'peripatetic' instructors who are available to assist junior supervisors, particularly where the job is complicated or where the trainee is slow to learn. These instructors can greatly help production by doing the initial instruction on a new process or new method, thus eliminating the teething problems before the job is handed over to the junior supervisor. They are also useful in helping to train the labour force in a new branch unit until local instructors are selected and trained.

Most factories which follow the modern pattern of training should therefore have a small training area where initial instruction and induction can be carried out. They also need a team of instructors who are able to instruct not only in the training department but also to help wherever necessary with instructional problems on the shop floor; in particular they must be able to assist on 'follow-up' problems.

Whether instruction takes place in a training area or on the shop floor, what to do with trained instructors during periods of recession or fall-back in production always presents a difficulty, although not an insurmountable one. During such periods instructors can be used in other skills so that they are more adaptable when production in the factory begins to increase again. A slack period also provides a good opportunity to examine what is being taught, and to consider improvements in job breakdowns, visual aids etc; retraining of poor performers can be done more efficiently than at a busy period, and training facilities can be offered to assist in the training and placing of disabled persons. In the training section it may even be necessary for the instructors to keep jobs going, or there may be a delay in re-starting the section required. Once suitable training jobs are lost to production shops, it is not always easy to regain them.

The method of payment for trainees must also be considered. On the whole, it is probably best to pay trainees at a minimum earnings level during an initial learning period, such as two weeks, and then on a sliding scale where a job is likely to take longer to learn. It is important to have target values to provide an incentive to trainees to work to speed during the initial period. On the other hand, it has been found that if trainees are paid on piecework from the first day, training is quickly 'sold' to the experienced workers, many of whom ask for retraining to enable them to earn as much as the newer operators, but paying trainees in this way puts additional pressures on instructors, which are not entirely justified. Where new operators are undergoing a lengthy training scheme because of the complexity of the job, it is essential not to pay them less than those undergoing shorter training.

Period of adjustment

When the trainee has completed the training programme and reached the level of efficiency required, a suitable vacancy will be found for him. This is the time when problems of adjustment to the new conditions in the factory may arise and the level of performance will occasionally drop slightly while the

trainee settles down. Inability or unwillingness to fit in with a particular group can create other difficulties; these are sometimes unusual as is illustrated by the girl who was found particularly suitable for an assembly task in a shop situated on the sixth floor but refused to work there as she had 'no head for heights'! Whatever problems arise, it is a good plan to have a trial period of about two weeks during which the trainee still comes under the jurisdiction of the training department; this gives a breathing space when problems of settling down can be sorted out and, if difficulties prove insoluble, the trainee can return to the training department to await further placing. Close follow-up during this trial period is essential and the appointment of an instructor who is responsible for seeing that all trainees settle down in the factory can be invaluable to supervisors and trainees alike. If numbers do not justify this, the duties may have to be shared by several instructors. Either method can function quite successfully and while the first may be favoured because of the experience in placing gathered by the instructor, the second has the advantage that because of his training the trainee may be better known to the instructor before leaving the department. After the close follow-up of two weeks, periodic visits for about the next ten weeks are to be recommended, with written reports made at the end of the first and third months. Follow-up also provides an excellent check on the effectiveness of the training department's work.

4 Skills analysis training

With the growing emphasis on skills analysis training, an increasing number of training officers are attending courses on it and learning how to put it into practice. This method of training originated in Britain in the 1940s and, through the efforts of some of its early practitioners, has since spread to the USA and other parts of the world. Its chief exponent in this country is the consultant, W D Seymour,[1] whose books *Industrial Skills*[2] and *Skills Analysis*[3] give comprehensive treatment of the subject. It is not the intention to do more than comment here from the experience of a number of years in using this technique.

Skills analysis training, as its name implies, means a systematic approach based on an analysis of the skill of the experienced operator. Many people steeped in the traditions of TWI[4] may criticize it for the long time it takes to produce a training course but as W D Seymour has pointed out: "Unless the skills and knowledge of the experienced worker have been analysed and understood, and the training courses based on such an analysis and understanding, then any results achieved will be haphazard and not systematic".[5] The insistence that all jobs require two types of training, one for the knowledge content and one for the skills, is very sound. So many schemes fail because too much attention is given to the one and too little to the other; "A complete training scheme must set out to integrate the two".[6]

The following is a draft training syllabus using the skills analysis method:

Analytical method of training applied to power press operating

Job knowledge

1 Introduction—clocking in, cloakroom, restaurant and medical arrangements
2 Demonstration of job and training arrangements
3 Booking of work and method of payment
4 Safety

[1]The basic concepts of skills analysis were originated by his brother, the late Dr A H Seymour
[2]*Industrial Skills*, by W D Seymour, Pitman, 1966
[3]*Skills Analysis*, by W D Seymour, Pitman, 1968
[4]Training Within Industry (TWI)—a job instruction method of training so well known in this country as to need little comment. TWI spread during the 1940s from America to England, where it developed rapidly. It embodies common sense principles of training which can be grasped easily by a wide range of people. For the simple job, the type of instructional breakdown that it recommends is probably sufficient but not for the more complex job which demands greater depth. TWI tends to stress the visual aspects of a task at the expense of others, eg kinaesthetic. On the other hand, it can be a useful stepping stone to a fuller and more integrated scheme and in the training of instructors. TWI booklets can be obtained from the Department of Employment and Productivity.
[5]*Some Aspects of Training*, by W D Seymour, *BACIE Journal*, Vol 20, No 2, June 1966, p 73
[6]*Some Aspects of Training*, by W D Seymour, *BACIE Journal*, Vol 20, No 2, June 1966, p 73

5 Types of presses, names of parts, types of safety guards, eg interlock and fixed
6 Visit to factory
7 The company's history and talk on products
8 Fault analysis and quality specification

Job skill

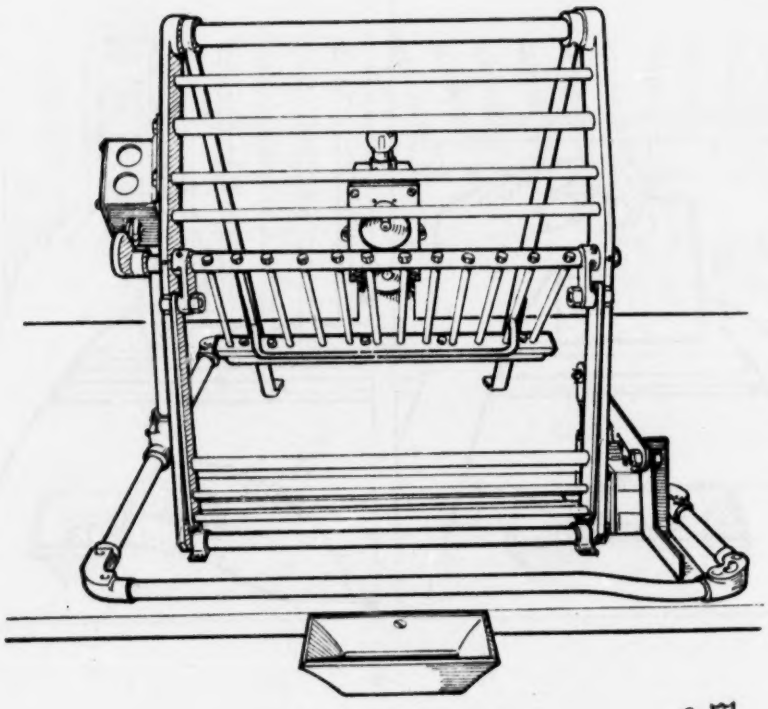
1 Activities of experienced operators analysed carefully in terms of both movement and use of senses. List made of all the activities the trainee might be called on to do, eg starting and stopping machine, positioning a variety of components in tool bases, operating a safety guard.
2 Analysis indicates that certain preliminary exercises would be advantageous, eg to practise picking up and positioning components of different shapes and sizes, to operate foot lever and safety guard. Targets set.
3 Analysis provides basis for breakdown of a whole job, eg second operation simple piercing, bending or raising job into sections. Instruction schedules prepared: RIGHT HAND; LEFT HAND; ATTENTION POINTS. The attention points indicate to the instructor the way in which he should train newcomers to use each of the senses and other points which need special attention. Targets set.
4 When each of the sections has been repeated several times correctly and to target time, the sections are combined step by step into the whole job. Trainees progress towards the total job by a carefully programmed time-table of half hour periods which are later extended into working periods of one, two and three hours.
5 Different types of other operations introduced, eg piercing, bending, forming, raising, blanking.
6 Operations repeated until standards of speed and quality are satisfactorily maintained over a day and then over several days.

Dextrainer Exercises

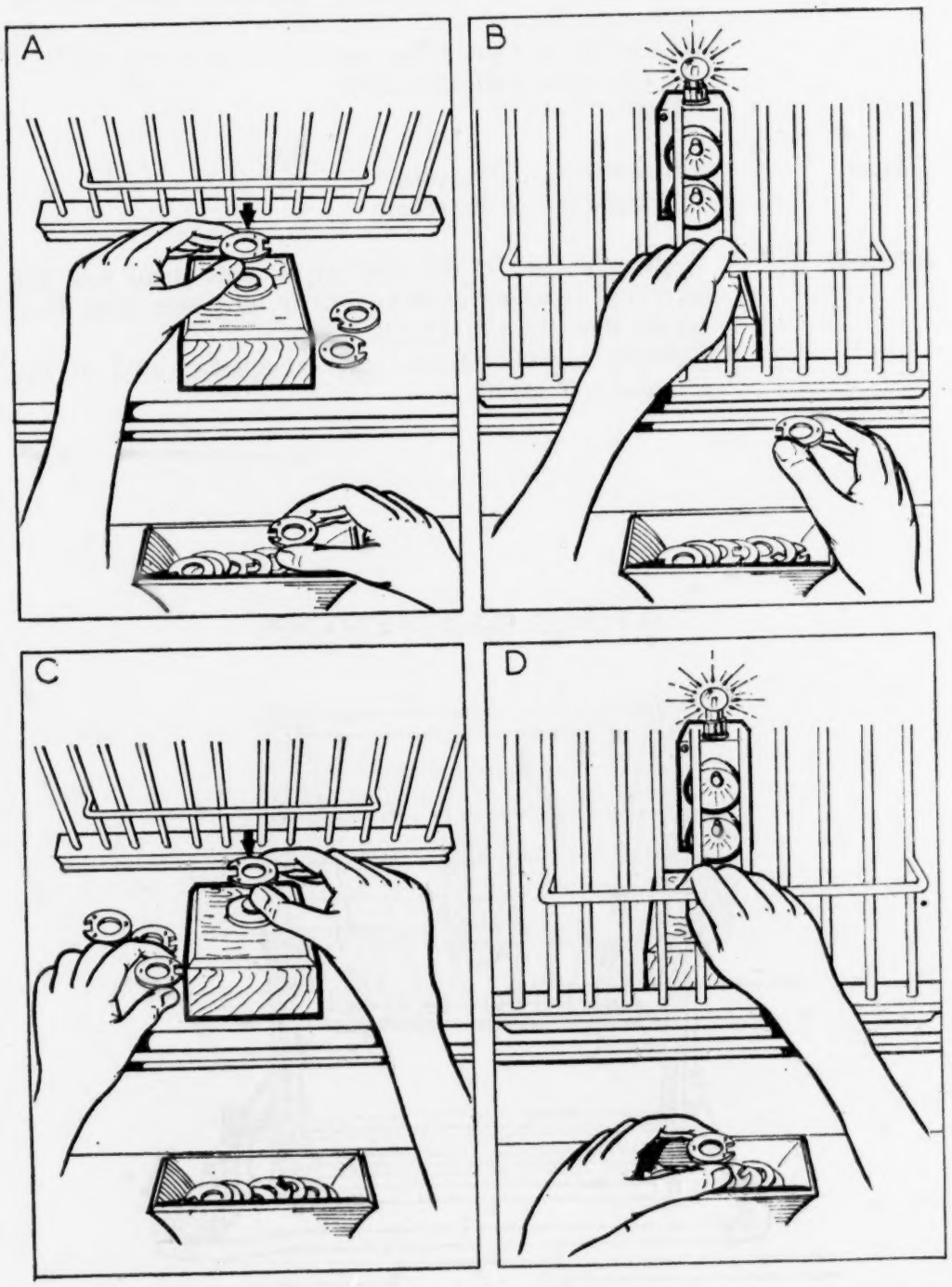
Operation	Power press	trainee seated at bench
Purpose	To practise picking up and positioning components with right and left hands, and to practise the operation of the foot lever and safety guards	
Description	A 1290 power press guard with foot lever attached to a series of red, amber and green lights A wooden block with a raised surface placed inside the guard to represent the base of the power press tool A quantity of end plates with centre hole in hopper fixed to bench At the beginning of the exercise the red light is switched on signifying that the machine is on	

Operating Instructions	Pick up a plate in each hand—position with left hand first. Close guard, pulling handle towards you with left hand. When guard is closed completely the amber light comes on. Press right foot on lever when amber light goes off, green light comes on. Open guard and remove plate with left hand and feed again with right hand Repeat
Target	8 components in 23 seconds 16 components in 46 seconds
Remarks	Drawing number of the 1290 power press guard with foot lever and lights attached as used in all power press Dextrainer Exercises is T 153265 Drawing number of the other equipment used in this Exercise is T 153100

THE POWER PRESS DEXTRAINER



THE POWER PRESS DEXTRAINER EXERCISE



Training syllabus for assembly work

Duration of course: four weeks (two weeks in works training department)
Objectives: to teach the correct use of assembly tools and equipment according to best work study principles; to teach safety, quality and speed as related to assembly work
Method of instruction: instruction and practice in graded assembly jobs; general induction lectures with specific talks on assembly with the use of visual aids

Syllabus

Job skill

First week:	simple sub-assembly instruction in the use of hand tools
Second week:	instruction in the use of air press and air screwdriver on more complicated assemblies soldering
Third and fourth week:	more complicated assemblies with accent on achieving piecework speed

Job knowledge
Talks on safety, factory procedures, quality, assembly tools
Talks on working methods, wages, products

The practice of breaking down the instruction schedule into RIGHT HAND, LEFT HAND and ATTENTION POINTS is invaluable to the instructor and, although time consuming, provides a much more thorough breakdown for training purposes than the TWI breakdown sheet, which can still be used for the simple jobs.

The use of training devices and exercises is also of great value, particularly where the job is complicated or with machines where there is an element of fear. For example, many women who have had experience of the old and dangerous 'fly' type of machine[1] are afraid to learn how to operate a power press but, if persuaded to experiment with a 'dummy' machine, they realize that the power press is much less tiring physically and soon develop into good operators.

Skills analysis training encourages trainees to work to targets, at first over short periods of time (eg ¼ hour, ½ hour, 1 hour) then gradually building up speed over the whole shift; there is no doubt that this helps trainees to develop a sense of confidence in their ability to acquire and maintain the speed of the experienced operator. It is also a good idea to train in pairs whenever possible, allowing trainees to time themselves and each other with a seconds clock and to record their own time; this too fosters a sense of achievement and competition. Wall progress charts, on which trainees can follow their own progress, keep them interested and achieve impressive results with young and old alike.

[1]Lever operated hand press

Fault analysis (ie the provision of an exhibition of faults where the instructor can have sessions with trainees so that a fuller understanding of quality standards is achieved) also makes for more thorough training, provided it is carried out systematically.

5 Training manuals

In any training scheme it is well worth embarking at an early stage on the necessary, if time consuming, task of preparing manuals which are not only essential for training new instructors but provide a useful check on the subject matter being taught. Some prefer to complete the manual when the first batch of trainees has been through the course while others find that in the early stages there is not sufficient time for its preparation, and postpone the job until a quiet period. These manuals will probably need periodic modification and revision as production changes take place but this in itself ensures that training is kept up to date. So often good training schemes are developed by training officers who are later promoted or who move to another company, but because nothing is written down their methods fall into disuse.

The following is a recommended précis for a manual for drilling operators:

Scope of programme	Object of programme Types of machines used in training Types of work used in training
Outline of programme	Method of training
Duration of course	
Qualities required in training	Physique Dexterity Co-ordination Intelligence Temperament
General notes for instructors	Including such points as: conforming to the time-table; looking at instruction schedule before instructing to make sure that no points have been missed; letting trainees know how they are progressing, etc
Time-table	Set out in days showing practical training and talks
Exercises	Details of exercises and training devices
Instruction	Breakdown of training jobs on LEFT HAND, RIGHT HAND, ATTENTION POINTS principle
Machine practice	Points about the machine on which it is important that the trainee should have some knowledge
Safety	Safety points listed (a) general (b) specific to drilling
Quality, inspection and fault analysis	Details of quality standard and sample fault analyses

Lectures	Details of talks which are necessary for knowledge of job
Samples of work records	Training progress record, training plan
Modification and revision	Provision for entering date and details of any change affecting the training course

Training manuals need not be elaborately produced. In fact, because of technical changes which may entail modification, there is a case for keeping production as simple as possible. To keep costs down they can be duplicated rather than printed but they should be well illustrated. It is sometimes possible to obtain the services of art college students specializing in technical illustrating—an excellent method of providing good experience for the students during the long vacation and good visual aids for the training manuals.

When preparing a manual it is important that the training officer brings in the specialist, such as the engineer or chemist, to establish standards of what is to be taught; the instructor should also be included as the exercise can contribute much to his own training. Instructors should have their own copies of the manual as there is a tendency for it to remain hidden in the training officer's file. They will thus be encouraged to take a much greater personal interest in applying the contents of the manual.

6 Instructors

The success of any training scheme depends on the ability of its instructors and great care must therefore be taken in their selection and training.

Selection

Wherever possible selection should be made from within the factory or organization as the job of instructor offers promotion, particularly for women for whom otherwise opportunities may be limited. There is also considerable potential ability to be found on the shop floor, not so much among male operators perhaps, but certainly among the women. In nearly every factory there are operators with ability and personality who for one reason or another were deprived of suitable educational opportunities and are doing routine jobs well below their level of ability. In a newly established factory in a new area, it is obviously not always possible to find someone with much company service; thus where it is necessary to select someone with short service it is even more important to take care in selection.

Written application either by form or letter should be requested as this indicates if the applicant can express himself clearly in writing—not always a strong point of would-be instructors. This should be followed up by a written report from the applicant's supervisor. Initial interviews should be carried out by a personnel or training officer, preferably backed by the use of tests; a relatively simple intelligence test plus a few manual dexterity tests and a test of vision would be particularly useful.

Short list

A short list of applicants should then be prepared and the final interview carried out by a small panel representing supervisory staff and the personnel department. The more senior the manager in charge of this job the better, as management's interest in training is made apparent to all and the new instructor is able to start off with the right kind of backing.

Other points to look for apart from intelligence and dexterity are the qualities of leadership that one would expect to find in junior supervision; good appearance and bearing; an even temperament and patience; self-reliance and experience. The ability to instruct is paramount but may be difficult to determine initially; indications of this ability, however, can be seen in applicants who are willing to put themselves out to help the new employee settle into the job. The really good instructor has an innate desire to impart information to other people; an appreciation of method study is also useful.

The following is an example of a job specification for an instructor teaching on the shop floor and not in a training area:

Job title—instructor on shop floor of small factory

Duties and responsibilities

1 Instruct new employees, trainees and retrainees daily
2 Supervise closely all trainees to detect errors of work and to instil a high standard of quality
3 Supervise to give confidence and to assist trainees to acquire speed
4 Supervise to ensure that all trainees understand safety precautions
5 Maintain a high standard of discipline so that new employees may realize what is expected of them
6 Induct new employees—show them clocking station, cloakrooms, restaurant, surgery
7 Work under direct supervision of shop foreman
8 Keep foreman informed of progress of trainees and make recommendations on final placing. Keep records of progress
9 Maintain contact with chargehands over supplies of work and tools, and progress of trainees. Similarly, liaise with personnel officer on trainees.

Education	Secondary modern
Previous experience	A minimum of two years as an operator in the factory Experience in instructing or minor supervisory duties would be valuable
Training time	Nine months
Initiative	Arranges instruction of trainees
Dependability	Must be reliable and dependable
Planning/co-ordinating	Plans instruction, progressing from simple to more difficult jobs
Cooperation and contact	Contact with chargehands, production control staff, personnel officer
Physical fatigue	Long periods of standing
Working conditions	Factory floor. Should have own bench where can talk to trainees and keep records

Training

If there is a training officer in the firm who is familiar with analytical training methods, most of the training of instructors would be his responsibility, following systematically the training manual for the particular type of work. Background knowledge of work study and human relations is essential to the job of instructing and a work simplification course on simple motion study and a TWI job relations course provide a good basic knowledge of these subjects. For the more able instructors, full-time courses on MTM (Methods Time Measurement) give them a sound knowledge of method study, while the less able can cope adequately with appreciation courses.

If analytical training has not yet been introduced in the firm, the TWI job instruction course is a good starting point and encourages instructors to look

'analytically' at what they are going to teach by insisting on job breakdowns. Some people consider that instructors must have sufficient practice on every job which they are going to teach to enable them to work at the speed of experienced workers. Admittedly this is most impressive when it is achieved, but the instructor does not have to work consistently at the speed of experienced workers to be successful if he is able to give clear instruction to a trainee working from a prepared job breakdown.

Other background courses which are necessary for new instructors cover safety (eg TWI job safety) and quality. Although much can be achieved by attending courses, tutorials held by the training officer or the person to whom the instructor is responsible can enable the instructor to know how to deal with some of the problems of training. The preparation of 'notes for the guidance of the instructor' is most useful for this purpose; a copy of these notes, which can be used as a basis for discussion with new staff, should be given to instructors as their reference manuals.

Extracts from a sample instructors' manual

Personal example

Remember that initially the trainee will be working more closely with you than with anyone else and that his attitude to his work will be largely influenced by you. It is therefore most important to set a good example in such matters as application to duties, timekeeping, tidiness and personal appearance.

Personal relationships

Although every trainee will have been interviewed, tested and selected for the work you are going to teach, there will always be some who are uncertain at first of their ability to learn the job and adapt to a new environment. A helpful instructor can soon instil confidence in even the most nervous newcomer.

In every case you should:

(a) quickly put the trainee at ease by having a short friendly chat as soon as he or she has been introduced to you;

(b) show a business-like approach to your work but at the same time be pleasant and patient, especially with newcomers who appear to be difficult or unsure of themselves;

(c) not hesitate to reprimand a trainee if you feel there is a genuine reason but always take care to do this out of hearing of others and in a calm but firm manner;

(d) try not to bring your own domestic troubles into the training department. Anxiety is soon noticed and spreads quickly to the detriment of a trainee's progress.

Authority

You will have a position of authority similar to that of a chargehand, but remember that your real standing in the eyes of trainees will always depend much more upon your personality and ability than upon formal status. As you gain experience, you will find that you carry more weight with your trainees.

You are unlikely to have difficulty in maintaining proper discipline if you have their respect and if you always keep them busy and interested. They will respect you for three main reasons:

1 You can do the job well
2 You are always prepared to help them in every way you can
3 You enable them to do things which otherwise they could not do

Your ability to create and maintain the trainees' interest in the job depends to a great extent upon how well you succeed in:

increasing your knowledge of the job. There is always more in a job than first meets the eye and the greater your own background knowledge of the work, the easier it will be for you to capture the interest of others;
increasing your understanding of and interest in the trainees as individuals;
acting as the interpreter for trainees by telling them, while they are doing the job, exactly what is happening and why—in other words, generally encouraging them to develop a properly informed interest in their work. The way to get the best from trainees is by encouragement, not by trying to drive them.

Other points which should be covered in the notes are the reporting back of problems, attention to job methods and target times, quality training jobs, and the need to keep records as well as detailed notes on instruction such as those in TWI job instruction; these include ensuring that the tools and equipment to be used are in good working order and explaining the physical requirements for the job.

Most instructors have to give short talks either formally in a lecture room or informally round the bench—an aspect of their job which is often neglected when their training is planned. Department of Employment and Productivity courses such as those held at Letchworth are excellent and the training officer may also accomplish much by holding tutorials with new instructors and using the 'notes for guidance on how to give a lecture'. Points to be stressed include:

1 Careful preparation	Keep subject matter simple; limit time to $\frac{3}{4}$–1 hour; arrange subject matter accordingly; ensure that there are no outside distractions
2 Careful planning	Every talk should have a BEGINNING MIDDLE END
3 Making trainees interested in lecture and holding their interest	Make introduction lively Arrange for class activity whenever possible
4 Ensuring that talk is getting across	Quizzes or exercises where the results can be seen immediately are a good check on how much information has been absorbed

5 Use of visual aids
6 Blackboard technique
7 Question technique

Full-day and afternoon conferences can provide a useful means for training existing instructors informally. Apart from other advantages, they give an opportunity for instructors from scattered units to meet and discuss their problems.

Sample programme for full-day conference

		Speaker
9–9 30	Company requirements	Group personnel manger
9 30–10 45	Work study and operator training	Work study manager
11 15–12 30	Keeping training methods up to date	Senior training supervisor
1 45–3 15	Group discussions: (A) Instruction schedules (B) Problems of follow-up (C) Assessing trainees (D) Instructing on the shop floor (contrasted with instructing in a training department)	
3 30–4 00	Reporting back on group discussions	
4 00–4 45	Films on training techniques	
4 45–5 00	Summing up	Conference chairman

Sample programme for an afternoon conference

2 00–2 30	Training policy and future developments	Senior training supervisor
2 30–3 30	Machine developments	Chief project engineer
4 00–5 00	Skills analysis principle	Analytical training officer

7 Records

It is essential to keep accurate records of the progress of trainees so that all the necessary information is available when considering placing them in the factory. Instructors should be encouraged to keep simple records and not to try storing in their heads details about trainees which they will probably forget. The TWI training plan (TWI 14) provides a simple framework. For a fuller record, an individual card is recommended for entries on daily performance, plus a graph on which progress can be plotted (Fig 1). The training officer should keep a record card of personnel details and selection test results; this card should also include a training report, a summary of which should be issued to the foreman and to the personnel officer at the end of the training period (Fig 2). Follow-up records are also important, particularly when the operator has to be considered for other work (Fig 3). As already mentioned, simple wall charts placed near the benches and machines of trainees allow them to follow their own progress and foster a sense of achievement and competition. Industrial training boards insist on the maintenance of records. At present, for example, the Engineering Industry Training Board requires a register of people on the payroll who are being trained. The register must be compiled weekly and must cover all forms of training, both on and off the job internally and also externally. The board has also recommended keeping individual records.

If training is done in a special area, it is wise to keep accurate records of all work completed by trainees to avoid any arguments with production staff. Whenever possible, particularly if the work is going direct to the consumer, it is advisable to mark and date any products completed by trainees in order to avoid unjustified recriminations over rejects. In fact trainees often make less scrap than experienced workers because they take more care initially, being anxious to make a good impression.

Fig. 1

TRAINING DEPARTMENT WORK RECORD

Name Section No.

	Job						
	Target						
	No. Done						
	Job						
	Target						
	No. Done						
	Job						
	Target						
	No. Done						
	Job						
	Target						
	No. Done						
	Job						
	Target						
	No. Done						
	Job						
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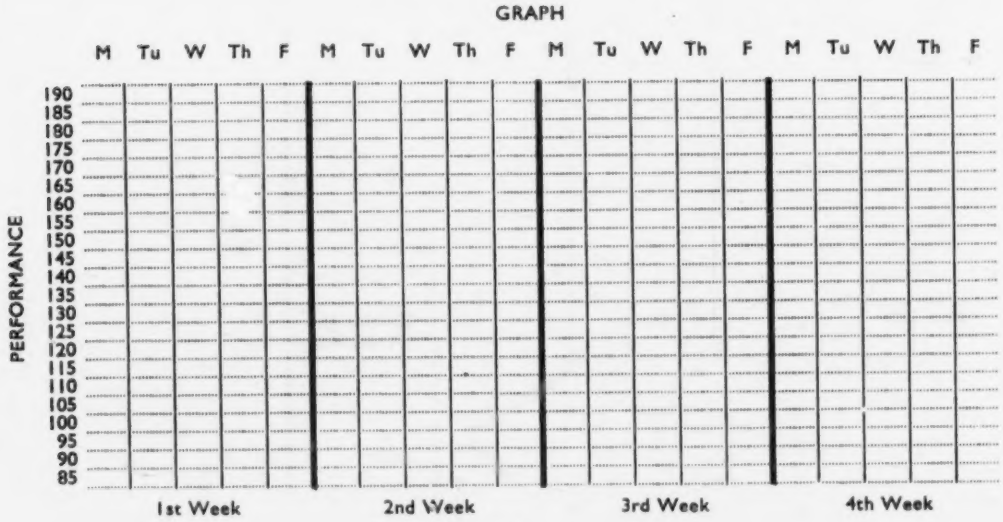
	No. Done						
	Job						
	Target						
	No. Done						

GRAPH



Form No. 7342A

Fig. 2

TRAINEE RECORD PERSONNEL DETAILS

WORKS TRAINING DEPARTMENT

Name	Check No.	M/S/W	Date of Birth	Date of Engagement

Address	Type of Training and Lectures

Interview Notes

	Capstan or Grinding	General Machines	Power Press	Coil Winding	Assembly	School
Selection Test Results						

	Directions	Lines	Steadiness	Bimanual	Screws	Discs
Individual Test Results						

Tryout Date	Check List	Dept.	Job	
Transfer Date				
Date Left		Reason		Suitable for Re-engagement

Progress Report

Form No. 7343

TRAINEE RECORD
FOLLOW-UP

Fig. 3

WORKS TRAINING DEPARTMENT

WEEKLY PERFORMANCE					
Week Ending	Monday	Tuesday	Wednesday	Thursday	Friday

Name

Check No.

Dept.

Job

FOLLOW-UP INSTRUCTOR'S REPORT

8 Induction

For the average newcomer, settling down in a factory is much more than a question of finger dexterity and ability to perform a particular task at speed; it is also a question of fitting in and feeling at ease with the group. One of the ways in which we can assist new employees is by giving them information about various aspects of factory life, bearing in mind that what seems commonplace to us may be strange to them. This is what we mean by induction training, the importance of which is too often under-rated. If we fail to give the necessary information, the newcomer is left to gather it as best he can; this often means that he is fed with much incorrect information from a variety of sources. Talks on factory procedure, rules and amenities, safety, wages and quality are essential but we could do more to encourage the interest that new employees often want to show in the history and scope of the firm they are working for and in the products they are making—points which tend to be under-estimated.

Finding their way about the factory presents difficulties to most new employees and, apart from better signposting, some time devoted to this aspect of factory life can be of great assistance.

Some people may question the wisdom of attempting a talk on wages because of the complicated wages structure of many firms, and it is true that even youngsters coming into the factory from school have only a sketchy knowledge of fractions and decimals. But a general explanation does give some idea of the principles of piecework, for example, and the newcomer ceases to think that double time means double the consolidated rate. The pay-card difficulties sometimes encountered by the new employee arise not only because of piecework schemes but because of deductions, particularly income tax deductions, and a talk on wages can deal with queries of this nature. It is not uncommon to find new women employees who have been paying too much tax in previous jobs and who are naturally delighted to learn how matters can be put right.

The timing of induction talks is most important. In 1955 the National Institute of Industrial Psychology set up a project on in-plant training, which found that personnel officers often had a good scheme of induction talks on paper but that it never seemed to work in practice. If the talks were given during the first morning the new operators were not particularly receptive, while if they were held later there were difficulties in releasing people from production. Carrying out induction in an already established operator training department has the advantage of making it possible to space talks more effectively so that new employees do not suffer from mental indigestion; it is also usually easier to release the operator from the training task than from the production task.

Where most operators are paid on a week in hand basis, it is usually better to delay a talk on wages, particularly on piecework, until the second week of employment when the new employee will have received his first pay-card. But some

training officers prefer to give a talk on day work wages during the first week to clear up any difficulties which may have arisen through misunderstanding of rates quoted on engagement. If time is available, two talks on this most important subject are to be recommended.

Sometimes the real problem of having an effective induction scheme is one of administration. Induction courses are frequently conducted spasmodically and haphazardly because no one person is responsible for running them regularly; nor do grandiose schemes with specialist lecturers always work in practice. For example, many departmental heads feel that they are unable to assist on a regular weekly basis at a particular time. More effective use could be made of instructors to help with induction programmes provided that they are given assistance with the course content plus full instruction in the technique of giving talks, and that they have the backing of good visual aids. Such aids are a necessity for induction talks since they enable people to absorb information more easily and make the information more interesting. They need not be elaborate, eg a simple poster type is sufficient for a procedure talk or an enlarged copy of the pay-card for a wages talk; more expensive aids such as tape recordings with visual panels or films and film strips are to be recommended for matters like safety.

Example of an induction programme

A much more ambitious and effective induction programme can be organized in an already established operator training department but where this does not exist a programme may be planned on the following lines:

1st session (to be held on the Wednesday of the first week, assuming that new employees start work on the Monday)

Three half-hourly talks on:

(i) Procedure—covering points such as regulations on clock-cards; necessity for notification of absence and change of address; need for medical certificates during sickness absence

(ii) Safety

(iii) Quality

2nd session (to be held on the Wednesday of the second week)
Wages
Organization of company
Social and sports facilities, amenities

3rd session (to be held on the Wednesday of the third week)
Products
Method study
Visit to other departments

9 Training of special groups

The disabled

For some years the Joseph Lucas organization has offered training facilities to the Spastics Society and the Blind Institute in order to help them to place girls and youths in employment all over the country. The opinions expressed here are based on the author's experience of instructing such trainees and others employed by the company.

When training the disabled it is often found that training follows a period of enforced idleness due to illness or inability to find employment. This means that the trainee can experience genuine difficulty in adjusting to the work environment. At first he may find the discipline that the factory imposes hard to accept, eg timekeeping or working a full factory shift. Allowances may have to be made for travelling difficulties and permission given to leave the factory before the normal rush hour. But it is worth encouraging the disabled employee to work the full shift from the start if possible, even if additional rest periods have to be granted. The trainee may have accepted factory life grudgingly as a second or third choice; and consequently he is not really interested in the work and this presents another problem. A difficult home background where the parents are unable to come to terms with the disability can also seriously hamper progress; or a disabled trainee away from home may be homesick. But many trainees are more than grateful for the opportunity of employment and apply themselves to the given task much more conscientiously than the average able-bodied person. They may also have a limited experience of a particular type of work and welcome the opportunity of enlarging it.

It is most important to give a disabled trainee the impression that he is no different from any other trainee, and to let him think that he can master the job. It is essential for instructors to be ready to spend more time with such trainees and to continually encourage their efforts. Encouragement may also be necessary to persuade them to make use of a disabled limb at work. For example, the spastic youth who keeps his disabled hand in his pocket and uses only his good hand may need considerable encouragement to use the other hand in even a limited fashion but it is worth persisting for it will help him to work at a higher speed.

The use of training devices and exercises before machine training is even more important in the instruction of the disabled than it is of the able-bodied. On a dummy drill, press or capstan lathe the trainee learns the correct movements so that he does not waste energy when he comes to operate the actual machine; similarly, the blind trainee learns the feel of the job without the dangers of the real machine. Disabled trainees generally gain confidence to use hands and feet even in a limited way and to co-ordinate their movements. But it is important

that the training devices used should reproduce almost exactly the features of the machine since the disabled person has more difficulty in transferring the skill he has acquired.

Although naturally it is expected that these trainees will have greater difficulty in achieving piecework speed, it is worth encouraging them to work to set targets and to record the results, even if they are low; each small step forward represents a major advance. The amount of physical energy which has to be expended on a job is of great importance and care must also be taken to give the right type of training. For example, a young spastic with a leg disability may find it difficult to concentrate for long on a machine job involving the use of a foot pedal, whereas he may find it quite easy to concentrate on an assembly or inspection job where he is using only his hands. Deaf and dumb trainees do not present much difficulty in learning jobs if detailed demonstrations of each part of the work are given. Job knowledge can be imparted with the help of written instructions.

The older worker

Less would be heard of the problems of training the older worker if more firms ran comprehensive training schemes for all trainees. Older workers can in fact be fitted into existing schemes without much difficulty. Some time ago a television programme related a success story of a firm in the Midlands which had had most satisfactory results from training men over 40 on semi-skilled machine work, but it seemed that no special arrangements had been made because the men were older. What had been done could equally well have applied to younger men, ie a training area had been set aside for instructional purposes and specialist instruction was given by trained instructors.

It is important that older trainees should be given sufficient time to learn and to acquire the speed of the experienced worker. They may take longer than a younger person but if allowed extra time to acquire speed they tend to work more consistently than many youngsters. Moreover, one has to distinguish between the older woman, eg a widow who has been working in factories all her life, and the older woman who has had a long break from industry bringing up her family. The former can and does learn as quickly as the young trainee while the latter takes longer to adjust herself to factory conditions and job methods which may have greatly changed from her younger days.

Older trainees should be able to control the speed at which they take instruction. Demonstrations may cause difficulty because the older trainee fails to grasp points made or misses essential details; thus they may have to be repeated more often or made more slowly. Simple written instructions on a card at the work bench or machine may be useful in certain cases. Older people tend to learn much better by 'doing' and it may be necessary to make adjustments to any talks and lectures to enable them to absorb the information more easily. It is also important to prevent the older trainee as far as possible from making mistakes during the early stages of training. If they make errors initially, they have greater difficulty in unlearning. This is true also where older trainees have

picked up poor working methods at another firm, eg working with one hand only.

Older workers are often more reliable timekeepers. This advantage is particularly true of the older married women whose domestic ties are lighter and whose children are older and no longer require so much attention. Providing they do not take a job which overtaxes their health, these women can be excellent employees, sometimes motivated by long term goals like contributing to the expenses of a son's education at school or university.

Immigrants

In many ways, the problems of training immigrants are no different from training local employees. The key is to find the right kind of job to suit the person's abilities. Physique may be an important factor. Many West Indian and African women have large hands and fingers and are much more suitable for jobs where strength and steadiness of hand is essential than for small intricate work, while Indian and Pakistani women have small hands with slim fingers and therefore often excel at delicate work. Language presents some problems, particularly in selection, and the use of a non-verbal intelligence test will give a more accurate assessment of the trainee's capabilities than a verbal one. Training instructions must be worded simply and clearly and more time spent on demonstration. Notices in the training department and in the factory should be worded simply with diagrams wherever possible. On the other hand illiteracy is not a deterrent to becoming a satisfactory operator, as has been proved in training Irish immigrants of gipsy origin.

10 Retraining

As with training the older worker, if a company has a training scheme for new employees, retraining can be fitted in fairly easily. Problems of retraining loom large because in many instances no training schemes exist at all, but it must be realized that the financial aspect is probably more important here than in the training of new operators. The problem of compensating for loss of earnings has to be studied carefully or wrong attitudes to the new job are formed and retraining is doomed before it starts. It is also essential to give prominence to the problems of selection. Just as in the training of the new operator, selection and training must go hand in hand as it is always necessary to discover if the operator has the ability to be retrained for certain jobs. When a production job has ceased, retraining is all too often carried out for another existing vacancy without any real thought of whether the person is suitable for the second job.

It is possible to differentiate between various types of retraining:

1 Retraining the employee from another firm who has been trained for the job but has picked up poor working methods, eg working with one hand, working from the lap instead of from hoppers provided, stretching too far etc. This kind of retraining can be difficult and a great deal of persuasion may be necessary; demonstration is invaluable to show that the work can be done at speed with less effort and there is a distinct advantage if the instructor can sit down and work at piecework speed to illustrate that his method is quicker and easier.

2 Retraining sub-standard performers. This is also difficult because most people, young and old, have a problem in unlearning. Training devices may be helpful as has been found with fly-press operators learning to manage a power press. On the other hand, retraining of the sub-standard performer need not present too great a problem as the operator has probably been fully trained in the first place. For example, a girl who was being retrained on a rather tricky 'lapping' operation was able to double her performance in three days under the guidance of a trained instructor; she had previously spent a year on the job and admitted that she had never really understood what was involved in the operation.

3 Retraining the employee who has had to give up his previous job because of illness or accident. The trainee may have a chip on his shoulder because of his disability but many retrainees in this category are only too willing to attempt to overcome the obstacles. Retraining may follow a period of enforced idleness; trainees are therefore often anxious to be back at work among their fellows and apply themselves conscientiously to the new task.

4 Retraining operators who have become redundant in another part of the factory or organization. Established employees are very sensitive about the break-up of the working group and may have little or no motivation to train

for something new. In one company, for example, a small packing unit had to give way to a new depot where there was no opportunity of employment for the group. The group concerned refused to believe, almost to the last moment when they could see the demolition people moving in, that their unit was disappearing and at first refused all offers of retraining. They eventually accepted training in the company's works training department but progress was slow because they felt strongly that the unit should not have been dispersed and had no interest in new work. As they gradually accepted the situation, they became confident of their ability to learn a new skill and their performance improved. Careful assessment of their ability, together with training, led them to settle down successfully in twos and threes in other factories. Only two out of the 12 in the group left the company. The fact that retraining could be done as a group undoubtedly contributed to the success of the scheme.

Finally, it is always worth remembering that the reason for not making the grade may be the fault of the method and not the person being retrained. For example it was discovered that the machine on which an operator was unable to attain piecework speed should have been fitted with intermittent air to remove the finished component but unfortunately, because of technical difficulties, this device had been removed by the setter and the method had fallen into disuse. The operator, however, was still asked to work to the original piecework value. Judgement should never be passed without a full investigation of all the relevant facts.

11 Further information

This pamphlet has not attempted to cover the subject of operator training in depth but it is hoped that it has served as a useful introduction. The following is a list of organizations which provide further information:

The Institute of Personnel Management	5 Winsley Street (fifth floor), Oxford Circus, London W1N 7AQ 01-580 3271
The British Association for Commercial and Industrial Education	16 Park Crescent, Regent's Park, London W1N 4AP 01-636 5351
The Industrial Society	48 Bryanston Square, London W1 01-262 2401
The British Institute of Management	Management House, Parker Street, London WC2 01-405 3456
Department of Employment and Productivity	168 Regent Street, London W1 01-437 9088

In addition, the Industrial Training Boards publish training recommendations for all levels of training.

12 Bibliography

Skills Analysis, W D Seymour, Pitman, 1968

Industrial Skills, W D Seymour, Pitman, 1966

Operator Training in Industry, W D Seymour, IPM, 1959

Industrial Training for Manual Operations, W D Seymour, IPM, 1954

Training within the Organization, S D M King, Tavistock Publications, 1964

Training Made Easier, Problems of Progress in Industry No 6, DSIR, HMSO, 1960

Training Factory Workers, NIIP—Staples, 1956

The Training of Workers Within the Factory, NIIP—OEEC, Paris, 1957

Training the Adult Worker, E Belbin, Problems of Progress in Industry No 15, DSIR, HMSO, 1964

How Research can help Training, Hilary M Clay, Problems of Progress in Industry No 16, DSIR, HMSO, 1964

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IPM PUBLICATIONS

The following are available from the IPM, 5 Winsley Street (5th floor), Oxford Circus, London W1N 7AQ.

Functions of a Personnel Department, G R Moxon	3s 6d
Selection and Placement	4s
Induction—Introducing Industry to the Individual	3s 6d
Joint Consultation—A Practical Approach	4s
Personnel Management—A Bibliography	15s
Shift Work, F P Cook	4s
Some Principles of Training—Applied to the Retail Trade, Else Herzberg	3s 6d
Personnel Management in the Small Firm, J M Collingridge and M Ritchie	4s 6d
Staff Management, Elizabeth Barling	4s 6d
Operator Training in Industry, W Douglas Seymour	7s 6d
Job Analysis, H E Roff and T E Watson	7s 6d
Supervisory Training, J R Armstrong	7s 6d
Programmed Instruction, D Mackenzie Davey and P McDonnell	10s 6d
Personnel Management in Developing Countries, edited by J E Genders	10s 6d
Some Problems of a Factory—An Analysis of Industrial Institutions, Wilfred Brown	3s
Statistics and Personnel Management, M G Kendall	3s
Married Women in Industry, E M Harris	4s
The Worker in Modern Industry, Nigel Balchin	2s
Techniques or Men?	2s
Revising a Merit-Rating Scheme, A G P Elliott	3s 6d
Equal Pay, E Marjorie Harris	4s
Employment of Coloured Workers—in the Birmingham Area, Leslie Stephens	3s 6d
The Role of the Personnel Officer—A Group Review, Guy Hunter	4s
Operational Research and Personnel Management, Stafford Beer and R W Revans	3s 6d
Working Wives, Viola Klein	7s 6d
Employing Married Women, Viola Klein	7s 6d
Personnel Management and Working Groups, Anne Crichton	10s 6d
Trade Unions and the Individual in English Law, Cyril Grunfeld	12s 6d
Managers and Shop Stewards, Arthur Marsh	7s 6d
Living with a Computer, Enid Mumford	7s 6d
Industrial Behaviour and Personnel Management, Tom Lupton	7s 6d
The Milton Plan—A Study in Manpower Planning and the Transfer of Industrial Production, Alan Fox	7s 6d
Industrial Relations: What is Wrong with the System? Allan Flanders	8s 6d
The Labour Market, John Corina	7s 6d
The Development of Incomes Policy, John Corina	17s 6d
Manpower Planning, Daniel H Gray	15s
Selecting and Training the Training Officer, Nancy Taylor	15s
The Computer in Personnel Work, Edgar Wille	7s 6d
Retraining Older Men in the Art of Writing, A Roberts	6s
The Time-Span of Discretion Theory: an Appraisal, Alan Fox	7s 6d
The Future of Voluntarism in Industrial Relations, Allan Flanders	2s 6d
Personnel Management 1913–63, M M Niven (bound copy)	30s
Developing Effective Managers, T J Roberts	10s 6d
Perspectives in Manpower Planning, the Edinburgh Group	12s
People and the New Factory, D A Dodds	7s 6d
The Realities of Productivity Bargaining—An Industrial Relations Committee Report, edited by Marjorie Harris	10s 6d
Personnel Manager's Guide to Job Evaluation, George F Thomason	12s
Recruitment and Selection—in a full-employment economy, R A Denerley and P R Plumbley	14s
Reforming the Redundancy Payments Act, R W Rideout	12s
Training in Industry and Commerce, E J Singer	15s
Computers, Planning and Personnel Management, Enid Mumford	15s

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